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REMARKS

The application has been reviewed in light of the final Office Action dated December 27, 2007. Claims 1-36 and 38 are pending. Claims 1, 3, 5, 6, 12, 14, 16, 17, 23, 24, 26, 28, 29, 30-36, 38 have been amended to reconcile the claims with applicant's remarks of record regarding distinctions of the claimed subject matter from the cited art. Since such distinctions have previously been presented to and considered by the Examiner, applicant submits that no new issues (and no new matter) are introduced by the amendments. Accordingly, claims 1-36 and 38 are presented for reconsideration, with claims 1, 12, 23, 29, 35 and 36 being in independent form.

The specification was objected to as having informalities. The drawings were objected to under 37 CFR 1.83(a). Claims 1-37 were rejected under 35 U.S.C. §112, first paragraph, as allegedly not supported by an enabling disclosure. Claims 1-37 were rejected under 35 U.S.C. §112, second paragraph, as purportedly indefinite.

The drawings, specification and claims of this application have been reviewed with particular attention to the issues noted in the Office Action.

The Office Action states that various claim terms are purportedly not explained in sufficiently full, clear and exact terms in the specification.

The specification of this application has been amended to clarify the claimed subject matter, with particular attention paid to the Examiner's comments.

The present application relates to information compression technology (such as for digital image compression, sound compression, etc.). In information compression it is typically an objective to reduce an amount of coding by highlighting, grouping (such as through quantization) and/or otherwise retaining information directed to features of interest, while omitting or

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minimizing information not of interest.

The subject matter of the claims of the present application processes coefficients output by a DCT (discrete cosine transform) frequency conversion algorithm which performs a quantization process (that is, the coefficients represent quantized data). In such circumstances, coefficients that are 0 in value are not of interest and each such coefficient is referenced in the application as an "invalid coefficient". On the other hand, each of the other coefficients (that is, do not have 0 as a value) represent valid coefficients (that is, information of interest). In the subject matter of claim 1 of the present application, certain predetermined valid coefficients (for example, value of 1) are modified to invalid coefficients (for example, value of 0), in order to further compress the information.

In addition, information regarding valid coefficients can be considered and processed in any or a combination of multiples ways. As a first example, the number of valid coefficients in the quantized data can be determined, to address a concern of how much compression can be performed. As a second example, a magnitude of the valid coefficients can be considered, individually and/or summed together, such as to quantify volume of information. In each of the first and second examples, the spatial relationship or addressing of coefficients can be factored into the approach to make the processing more efficient. The subject matter of the claims of this application embodies advantages derived from applicant's recognition of such factors.

For the convenience of the examiner, Applicant has organized the remarks herein below into sections corresponding to Examiner's Objections to the Specification, Examiner's Objections to the Drawings, Rejections under 35 U.S.C. 112 and Rejections to the Claims. To better clarify the claimed subject matter of the disclosure, Applicant has addressed some remarks towards numbered paragraphs of the December 27, 2007 final Office Action to serve as non-

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limiting examples to show where said remarks are applicable in response to Examiner's

statements in the final Office Action.

Regarding Examiner's Objections to the Specification

Regarding final Office Action paragraphs 14 – 21 of the December 27, 2007 final Office Action:

Regarding paragraph 15:

The Office Action states an objection to the Amendment bridging pages 3 and 4 as

adding new matter to the disclosure; however as can be seen in figure 1 of the application as

originally filed (reproduced below), "Labels r00, r01, r02 ..." are clearly present.

FIG. 1
PRIOR ART
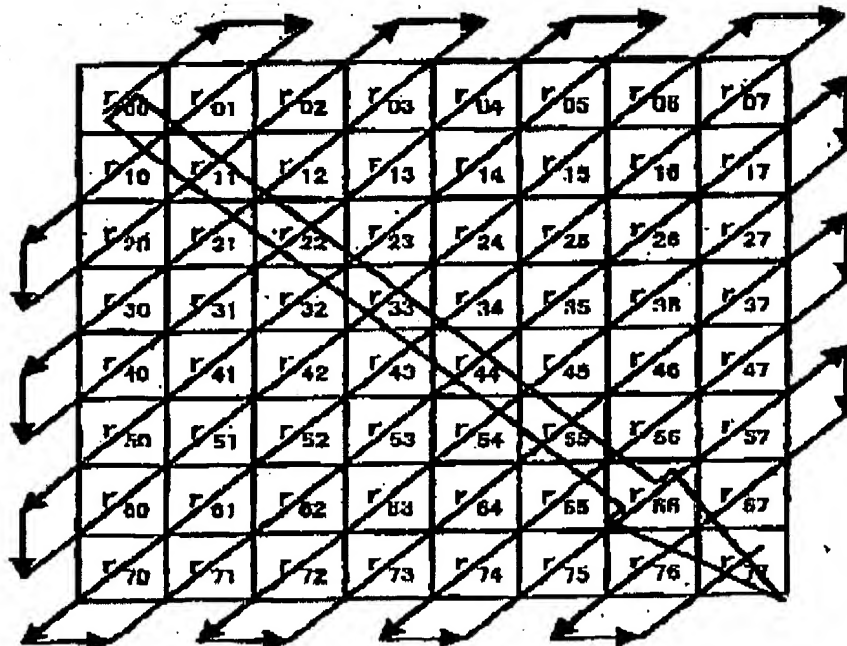
Furthermore, support that said labels in above Fig. 1 correspond to elements in Fig. 5-7 can be

found in, for example, paragraphs [0059], [0060], [0061] and [0076], of the specification as

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originally filed.

Regarding paragraph 16:

The Office Action states an objection to the amendment to lines 6-7 of page 16 and figure

5A. The Office Action states "Figure 5 is not properly supported by the specification as the

section of the specification purportedly relied upon to support it in were indicated are also

significantly amended."   The relevant section of the specification (paragraph [0066])

"purportedly relied upon" and is said to be "significantly amended" is reproduced below:

> When the image deterioration exceeds a limit even when the above-mentioned
> techniques is applied, an address of an isolated valid coefficient may be moved to line
> up other valid coefficients together without modifying the valid coefficient to the
> invalid coefficient. [[For]] In the example [[, in]] of Fig. [[4]] 5, the r13 pixel has a
> coefficient 1 . The coefficient 1 which is modified to 0. At the same time In another
> example (Fig. 5A), the coefficient 1 can be moved from r13 to the r22 pixel located in
> front of r13 is modified to a coefficient 1 in the inverse zigzag scan.

The above amendment to paragraph [0066] merely clarifies the claimed subject matter

and does not introduce new subject matter into the disclosure. Therefore the amendment to

paragraph [0066] is fully supported by the specification as filed and consequently paragraph

[0066] is fully supportive of Fig. 5A.

Regarding paragraph 17:

The Office Action states an objection to the amendment to page 18 line 9 through page

19 line 1, the relevant section of the amendment is reproduced below.

> The first valid coefficient (r13 with 1 value) initially searched by found in the search
> in the inverse zigzag scan shown in the example of Fig. 5 is modified to 0 (Steps 103
> and 104). At the same time, the correction counter 23 is counted up from 0 to 1 (Step
> 104).

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The office action states in paragraph 17, "The examiner does not believe that 'initially searched' discloses 'found in search'". However, as an example, Fig. 5 (reproduced below) clearly depicts a block register being searched for valid coefficients in a reverse zigzag scan order. The first valid coefficient found in Fig. 5 corresponds to r13 with a value of 1. Therefore in the context of the specification as filed, the amendment to page 18 line 9 through page 19 line 1 is fully supported.

FIG. 5
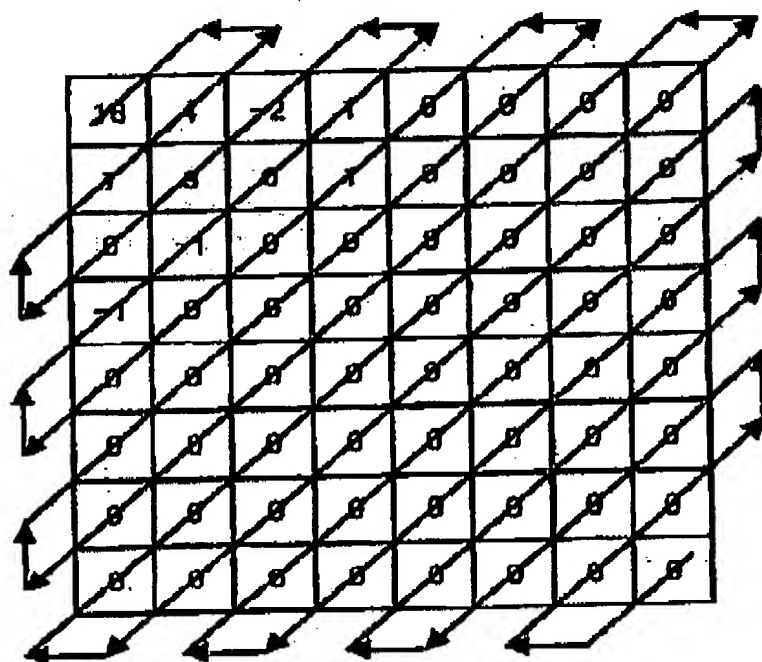
Regarding paragraph 18

The Office Action states an objection to the amendment to page 19 line 16 through page 20 line 5 stating "... searched does not support found. Furthermore amendments further describing moving a pixel are not fully supported by the disclosure as originally filed." With

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regard to "searched does not support found" please see Applicant's statements regarding

paragraph 17 above. The relevant section of the amendment objected to in the Office Action

regarding "moving a pixel" is reproduced below:

> When the image deterioration exceeds a limit even when the above-mentioned
> techniques is applied, an address of an isolated valid coefficient may be moved to line
> up other valid coefficients together without modifying the valid coefficient to the
> invalid coefficient. [[For]] In the example [[, in]] of Fig. [[4]] 5, the r13 pixel has a
> coefficient 1 . The coefficient 1 which is modified to 0. At the same time In another
> example (Fig. 5A), the coefficient 1 can be moved from r13 to the r22 pixel located in
> front of r13 is modified to a coefficient 1 in the inverse zigzag scan.

With regard to "moving a pixel" it is clear, from amended paragraph [0066] above, that the

application as originally filed fully supports moving coefficients corresponding to labeled pixel

locations. Furthermore, the amendments to paragraph [0066] merely clarify the claimed subject

matter and do not introduce new subject matter into the disclosure.

Regarding paragraph 19

Regarding objections to amendment to page 20 line 15 through page 22 line 8, in

particular the Office Action states in paragraph 19, "the second to late paragraph contains

numerous changes not fully supported by the disclosure as originally filed." The relevant section

of the amendment has been reproduced below:

> The correction level is set in the correction level setup register 22 (Step 201).
> The quantization execution module 10 then performs a DCT transformation and
> latches the quantized data into the 8 times 8 block register 21 (Step 202). [[The]] A
> search for valid coefficient is searched from in the block register blocks nets included
> in the searched block register [[net]] is performed (Step 203). The block register is
> checked to search for the block which closes register net having a valid coefficient
> which is closest to [[the]] high-frequency. In the example of Fig. 6, the block register
> net f5 is searched such a net (Step 204). The initially searched valid coefficient (r13
> with 1 value) is corrected to the invalid coefficient (r13 with 0 value). At the same
> time, the correction counter 13 is counted up from 0 to 1 (Step 205).

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The amendments to paragraph [0075] above merely clarify claimed subject matter already

disclosed and do not introduce new subject matter.

Regarding Paragraph 20

Regarding objections to amendments to page 24 line 21 through page 25 line 12 stating

"the summing step is not supported by the disclosure as originally filed." The relevant section of

the amendment objected to has been reproduced below:

> The block register 21 may include a calculating step for calculating a total
> sum of coefficients of block registers arranged along each scanning line
> corresponding to one of different frequencies used in the DCT frequency conversion
> algorithm (Figs. 6A), a summing up step for summing up a plurality of the total sums
> (Figs. 6A), and a start address changing step for changing an address of the block
> register to start the inverse zigzag scan.

However, support for said summing step can be found in the disclosure as originally filed, for

example, in paragraphs [0033], [0034], [0040] and [0041].

Regarding Paragraph 21

Applicant maintains that no new matter has been introduced by the amendments to the

specification objected to and that said amendments clarify the claimed subject matter and are

fully supported by the disclosure as originally filed.

Regarding Examiner's Objections to the Drawings

In paragraph 22 of the final Office Action, the drawings are objected to under 37 CFR

1.83(a). 37 CFR 1.83(a) is reproduced below:

> The drawing in a nonprovisional application must show every feature of the invention
> specified in the claims. However, *conventional features disclosed in the description and
> claims, where their detailed illustration is not essential for a proper understanding of*

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the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box).

The Office Action states in paragraph 22 numerous features "must be shown or the feature(s) cancelled from the claim(s)."

However, Applicant submits that all claim features stated in paragraph 22 of the Office Action are adequately depicted and/or are supported by other parts of the disclosure as originally filed, in accordance with 37 CFR 1.83(a), as well:

for claim 4, the first control mechanism and second control mechanism are represented in

Fig. 3 by search control device 24 and control device 40, respectively;

for claim 23, the step of performing an inverse zig zag scan is shown in, for example, Fig.

5, to search for a valid coefficient is shown in, for example, Fig. 4(S103),

continually performing an inverse zig zag scan is shown in, for example, Fig. 4

(combination of S105 and S103), counting a number of searched valid

coefficients is shown in, for example, Fig. 4 (S104), and modifying a subsequent

searched valid coefficient to an invalid coefficient is shown in, for example, Fig. 4

(S104 performed a second time);

for claim 24, wherein valid coefficients smaller than a predetermined threshold value are

modified to an invalid coefficient is shown in, for example, Fig. 4 (S104);

for claim 25, the presearching step is shown in, for example, Fig. 3 (element 40);

for claim 27 and 28, the calculating a total sum step and the summing up step are shown

in, for example, Fig. 6A;

for claims 6, 7 and 8 regarding the feature "plurality of logical OR circuits", in paragraph

10 of the final Office Action, "...examiner agrees that in light of a solid line in figure 6

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representing a plurality of 'OR circuits' It is clear from figure 7 that f8 is an 'OR circuit'

connection of nets f9-f15 in figure 6."

Regarding Rejections Under 35 U.S.C. 112

Regarding final Office Action Paragraph 27

Re: Scanning and searching

Applicant respectfully submits that it would have been understood by one skilled in the

art reading the disclosure as originally filed that "scanning" refers to the *order or direction* in

which coefficients are considered in turn and processed and "searching" refers to the operation of

looking for specific *content (that is, valid coefficient)*. Applicant has amended both the

specification and the claims to clarify the claimed subject matter relating to scanning and

searching.

Applicant submits "performing an inverse zigzag scan for scanning the block register"

refers to the order or direction in which coefficients are considered in the block register and "to

search for a valid coefficient" refers to looking for specific content (i.e. a valid coefficient).

Referring to claim 23, the feature of "counting a number of said valid coefficients found"

and "incrementing by one the number of valid coefficients counted" is thoroughly discussed and

supported in the specification as filed, for example, in paragraphs [0029], [0036], [0042], [0043],

[0044], [0060] - [0062] and [0075] - [0077].

The Office Action states in paragraph 27, "Also it makes no sense the number of valid

coefficients is incremented when a valid coefficient is changed to an invalid one." As stated in

claim 23, the number of valid coefficients found is compared with a "(a) ... predetermined

correction level indicating a degree of data correction" for the purpose of "continuing the inverse

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zigzag scan to search for additional valid coefficients, when the number of valid coefficients is

smaller than the correction level in step (a)". Therefore, when a valid coefficient is found and

changed to an invalid coefficient, the number of valid coefficients found is incremented so as to

compare said number of valid coefficients (indicating the number of corrections made) to a

preset correction level.

Regarding final Office Action Paragraph 28

Support for a predetermined threshold value can be found in the specification as filed, for

example, paragraphs [0015], [0030], [0037] and [0068]. One of ordinary skill in the art would

find the specification enabling. In addition, one of ordinary skill in the art would find Claim 23

steps (d) -- (f) (reproduced below) combined with dependent claim 24 (reproduced below),

enabling:

> 23. (previously presented) ...
> (d) modifying a valid coefficient found in step (c), to an invalid coefficient;
> (e) counting a number of said valid coefficients found in step (c);
> (f) searching for and finding another valid coefficient, and modifying said another valid
> coefficient to the invalid coefficient;
>
> 24. (previously presented) The information compression method as defined in claim 23,
> wherein steps (d) and (f), valid coefficients smaller than a predetermined threshold value
> are modified to an invalid coefficient.

Regarding final Office Action Paragraph 36 Re: "Isolated valid coefficient"

The Office Action states in paragraph 6, "... The objection to the specification is

withdrawn. However since there is no significant discussion of the rejection under 35 U.S.C.

112 first and second paragraph these rejections are maintained. Furthermore to overcome the

rejection applicant cites a section of the specification which has been significantly amended."

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The concept of "valid coefficient" is discussed extensively throughout the specification as filed. Support for "isolated valid coefficient" can be found in paragraphs [0024], [0032] and [0039] in addition to paragraphs [0065] – [0067] corresponding to page 19 lines 24 through page 20 line 9 of the specification as filed. The contention in the Office Action regarding "a section of the specification which has been significantly amended" (referring to [0065] – [0067]) is irrelevant since said amendments only clarify previously claimed subject matter, and do not introduce new subject matter into the disclosure.

Regarding final Office Action Paragraph 39 Re: Presearching

The Office Action states in paragraph 3, "The specification never defines or describes what is meant by the word presearching in any way." However, in paragraphs [0031] and [0038] of the original specification as filed (reproduced below), Applicant clearly describes presearching.

> [0031] The above-mentioned program of an information compression may further include a presearching step for searching quantized data output from the quantization execution module before the search step.
> [0038] The above-mentioned program of an information compression may further include a presearching step for searching quantized data output from the quantization execution module before the search step.

Applicant submits one of ordinary skill in the art would find the description of presearching, in the context of the specification, enabling.

In light of the remarks herein above, withdrawal of the objection to the specification, the objection to the drawings and the rejections under 35 U.S.C. §112 is respectfully requested.

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Rejections under 35 U.S.C. §102 and 35 U.S.C. §103

Claims 1-3, 9, 10, 12-14, 20 and 21 were rejected under 35 U.S.C. § 102(e) as purportedly anticipated by Mukherjee (U.S. 2003/0123740 A1). Claims 4, 15, 23-25 and 38 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Mukherjee in view of U.S. Patent No. 5,793,893 to Kim. Claims 29-31 and 35 and 37 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Mukherjee in view of Kim. Claims 11 and 22 were rejected under U.S.C. § 103(a) as purportedly unpatentable over Mukherjee in view of U.S. Patent No. 6,460,061 to Dick. Claim 36 is rejected under U.S.C. § 103(a) as purportedly unpatentable over Mukherjee in view of Kim and in further view of Dick.

Applicant has carefully considered the Examiner's comments and the cited art, and respectfully submits that independent claims 1, 12, 23, 29, 35 and 36 are patentable over the cited art, for at least the following reasons.

As noted above, the present application relates to information compression wherein a selected number of valid coefficients are modified to be invalid coefficients, to enable further compression.

For example, claim 1 of the present application is directed to an information compression apparatus comprising a correction level register which presets a correction level indicating a degree of data correction. Valid coefficient are modified to invalid coefficients until the number of modifications reaches the correction level preset in the correction level register.

Mukherjee, which is the primary reference cited in the Office Action, does not teach or suggest such an approach (that is, as provided by the subject matter of claim 1 of the present application).

Mukherjee, as understood by applicant, proposes an approach for compressing images of

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arbitrarily shaped objects including classifying each pixel within a selected block of pixels as

relevant or irrelevant, applying a forward transform to the selected block to generate a coefficient

block, modifying the coefficient values to generate a modified coefficient block subject to a set

of pre-determined constraints including a constraint that the relevant pixels have a same value in

an inverse transformation of the modified coefficient block as in the selected block, and

repeating for other coefficients having non-zero quantized values, in a reverse zig zag coefficient

order.

Mukherjee, [0079], which was cited in the Office Action, states as follows:

[0079] The optimization process repeats steps 740-780 until all non-zero
quantized coefficients have been processed or until the energy of the result exceeds
the pre-determined threshold.

Thus, Mukherjee proposes that coefficient values are modified until all non-zero

quantized coefficients have been processed or until the energy of the result exceeds the pre-

determined threshold.

Applicant has previously argued regarding Mukherjee that "threshold corresponds to a

specified energy level, and not to a specific number of corrections or modifications to the

coefficients (page 29 of Applicant's Response to the July 2, 2007 Office Action submitted on

September 21, 2007)."

It is contended in paragraph 12 of the December 27, 2007 final Office Action, that

"Applicants arguments with respect to the prior art have been considered but are not found

persuasive" because "a specific number of corrections or modifications to the coefficients" is not

specifically recited as a limitation in claim 1.

As amended, independent claim 1 states "a correction level register which presets a

correction level ... wherein said correction level indicates a number of corrections and/or

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modifications to the coefficients." Therefore, the correction level stated in claim 1 as amended

comprises the limitation of "a number of corrections or modifications to the coefficients."

Applicant submits the amendment to claim 1 merely clarifies the claimed subject matter and, as

can be seen from the above referenced citations in record, said amendment does not introduce

new matter into the disclosure.

Mukherjee, the other cited references, and Mukherjee combined with the other cited

references simply do not teach or suggest an information compression wherein a selected number

of valid coefficients are modified to be invalid coefficients, as provided by the subject matter of

claim 1 of the present application.

Applicant does not find teaching or suggestion in the cited art of an information

compression apparatus comprising a correction level register which presets a correction level

indicating a number of corrections and/or modifications to the coefficients., wherein valid

coefficients are modified to invalid coefficients until the number of modifications reaches the

correction level preset in the correction level register, as provided by the subject matter of claim

1 of the present application.

Independent claims 12, 23, 29, 35 and 36 are patentably distinct from the cited art for at

least similar reasons.

The Office Action indicates that claims 5-8, 16-19, 26-28 and 32-34 would be allowable

if rewritten to overcome the rejections under 35 U.S.C. 112. However, since independent claims

1, 12, 23, 29, 35 and 36 are submitted to be patentable over the cited art, no changes to the form

of claims 5-8, 16-19, 26-28 and 32-34 are believed to be necessary.

In view of the remarks hereinabove, Applicant submits that the application is now in

condition for allowance, and earnestly solicits the allowance of the application.
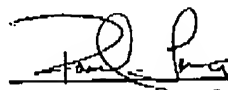
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     If a petition for an extension of time is required to make this response timely, this paper

should be considered to be such a petition. The Patent Office is hereby authorized to charge any

fees that are required, and to credit any overpayment, to our Deposit Account No. 03-3125.

     If a telephone interview could advance the prosecution of this application, the Examiner

is respectfully requested to call the undersigned attorney.

                                   Respectfully submitted,

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